Midterm 1 test correction 2

Level: 1st Year **Date : 27 / 11 /2024**

Material: Network Foundation 1 **Duration :1h 30min**

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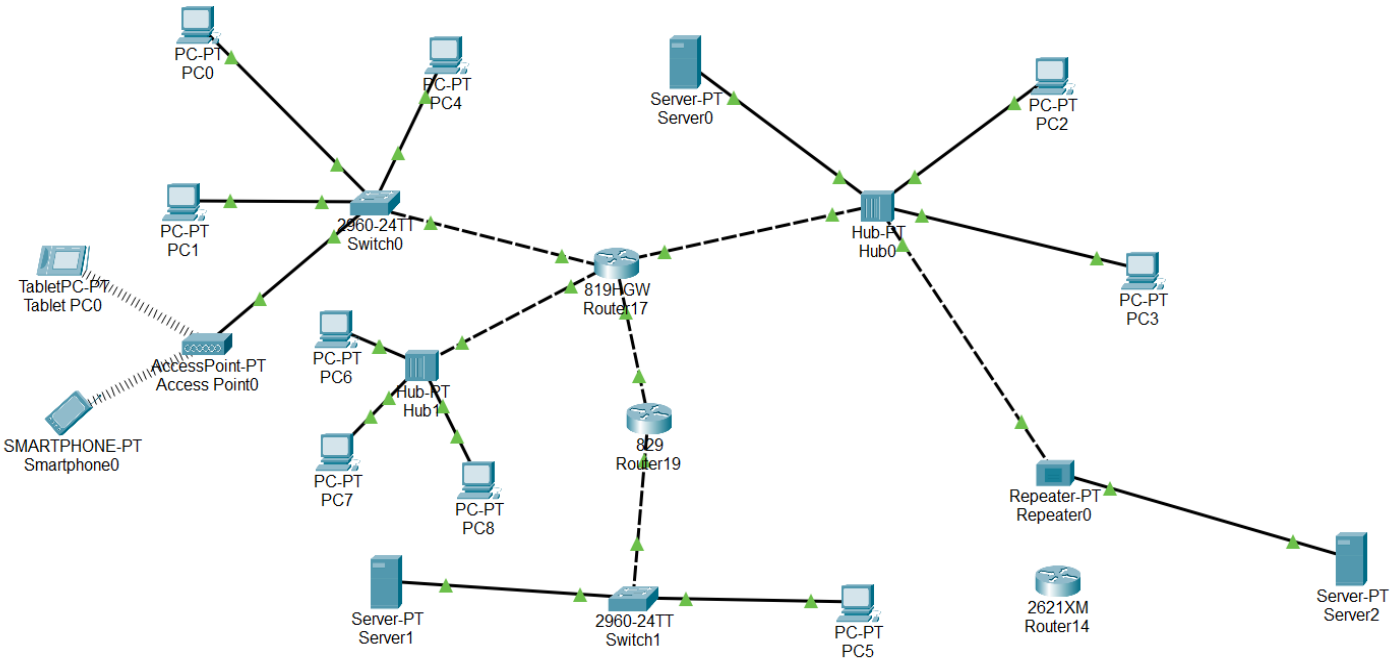
Part 2: Exercise 01 (07 points)

Given the network given bellow



1. What are the OSI model layer(s) and the TCP/IP model layers that exist in each device.

OSI MODEL	TCP/IP	DEVICE
Application	Application	PC,SERVER,Tablet,SmartPhone
Presentation		
Session		
Transport	Transport	
Network	Internet	Router
Data link	Network Access	Bridge,Switch
Physical		Hub,Repeater

2. How many collision domains are there in the diagram?

11

3. How many broadcast domains are there in the diagram?

5

4. Explain the path of the packets in the following cases:

a. When Machine "PC1" wants to communicate with Machine "Server2".

PC1 sends the packet to switch0 with @Mac Dest of Router17 and @IP of Server 2, then switch0 transmit it directly into the Router17 if the @MAC Dest of the packet corresponds to an entry of Switch0 MAC TABLE otherwise, switch0 broadcast it to all the connected devices. Next, Router17 checks its Routing table and forward the packet into HUB0 . The HUB0 broadcasts the packet to all the devices, where repeater0 receives it and transmit it to server2.

b. When "Tablet" wants to communicate with Machine "Server 2".

Tablet sends the packet to AP0 with @Mac Dest of Router17 and @IP of Server 2 , then AP0 broadcast it to all the connected devices. Next, Switch0 forward the Packet into Router17 that checks its Routing table to forward the packet into HUB0 . The HUB0 broadcasts the packet to all the devices, where repeater0 receives it and transmit it to server2.

b. When "PC7" wants to communicate with Machine "Smartphone".

PC7 sends the packet with @MAC dest of Router17 and @IP of Smartphone to Hub1, the Hub1 broadcast the packet to all the connected devices , then the Router17 receives the packet and forward it to Switch0 according to its Routing table ,after that Switch0 receives the the packet and transmit it to AP0 and finally AP0 broadcast the packet to all the devices .

5. Provide the PDU format (headers) at each layer of the TCP/IP model in the case when user 1 of PC0 with Mac address of 00–01–4B-B4-A2-EF and IP address of 192.168.1.15 try to send voice packet to web server. (1)

Application Layer	Web page, HTTP, type of data =voice format (MP3), user ID1.
Transport	Source port number, destination port=80
Network	IP source =192.168.1.15 IP destination=IP of web server.
Data link	Mac source =00–01–4B-B4-A2-EF Mac destination = Mac @ of concerned interface Router 17

6. If the "Router19" is replaced with a bridge, recalculate the new collision and broadcast domains. (1)

Broadcast Domain: 4

Collision domain :11

Exercise2: (06 points)

1. Give the tables content structure of: router, switch, bridge, hub and repeater

Switch and bridge has MAC table

Mac address	Interface

Router has Routing table

Ip destination	Next HOP	Number of hops

Hub and repeater do not have a table.

2. What is the difference between multicast and broadcast MAC addresses

Broadcast mac address used to send the data to all the connected devices (FF-FF-FF-FF-FF-FF).

Multicast MAC ADDRESS Used to send data to a specific group of devices

3. Give at each time what type of Mac address (unicast -multicast or broadcast)

a. FF-FF-FF-FF-FF-FF → Broadcast

b. 1B-65-A7-69-C6-22 → Multicast

c. 00–0B–C6-84-42-A7 → Unicast

4. What is the difference between half duplex and simplex?

Simplex is one direction communication

Half duplex two ways communication but not at the same time.

5. Where is session layer located in TCP/IP model? why?

Application ,because TCP/IP group the Upper 3 layers of osi model (Session, presentation, application)

6. Give the difference between Synchronous and asynchronous

Synchronous uses clocks to send data .

Asynchronous uses start bit and end bit to send data .

7. Employees in a company are capable of downloading films Over internet

what is connection mode in this case? Explain?

The connection mode for employees downloading films over the internet is Connection-Oriented. The connection-oriented mode establishes a persistent and reliable connection between the source (server) and the destination (employee's device) before transmitting data. Because of

- Reliability: (When downloading films, the data (film file) must be received in its entirety and in the correct sequence).
- Connection-Oriented mode ensures that all packets are delivered without loss, error, or duplication by retransmitting any lost packets and maintaining the order of data.
- Connection-Oriented mode operates with acknowledgments (ACKs) for data delivery, ensuring that the sender knows the data was successfully received.
- Most internet downloads, including films, use the HTTP or HTTPS protocols, which run on top of TCP. This makes it connection-oriented by design.

8. what type of switching is used in this case? why?

Packet switching because the communication is done via internet